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## GEOGRAPHIC INTELLIGENCE REPORT

### PARAGUAY

### PART I: REGIONAL ANALYSIS OF THE EASTERN UPLAND



CIA/RR GR L-60-3, Part I

August 1960

**CENTRAL INTELLIGENCE AGENCY**

**OFFICE OF RESEARCH AND REPORTS**

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CONTENTS

	<u>Page</u>
I. General Orientation . . . . .	1
II. Physical Environment . . . . .	2
a. Terrain . . . . .	2
b. Soils . . . . .	5
c. Flora and Fauna . . . . .	6
d. Climate . . . . .	8
e. Water Supply . . . . .	11
III. Population . . . . .	11
a. Distribution . . . . .	11
b. Ethnic Groups . . . . .	12
c. Sanitation and Health . . . . .	13
IV. Civil Government and Military Centers . . . . .	14
V. Transportation . . . . .	15
a. Roads . . . . .	15
b. Railroads . . . . .	16
c. Waterways . . . . .	17
d. Air . . . . .	19
VI. Telecommunications . . . . .	19
VII. Economic Development . . . . .	19

Map

	<u>Facing Page</u>
Regions of Paraguay (Orientation Map) . . . . .	1

REGIONS OF PARAGUAY



PARAGUAY

PART I: REGIONAL ANALYSIS OF THE EASTERN UPLAND\*

I. General Orientation

The Eastern Upland Region comprises most of Paraguay east of 56°30' west longitude. It consists basically of the Alto Paraná Plateau and the Amambay Hills and has an over-all extent of roughly 68,000 square kilometers (26,250 square miles). The region includes all of the Departamento de Alto Paraná,\*\* most of the Departamentos de Amambay and Caaguazú, and parts of the Departamentos de Caazapá, Itapúa, Guairá, and San Pedro. (See map annex).\*\*\*

Most of the western margin of the region is marked by an irregular line of low, north-south trending, forested hills. The southern, eastern, and northern boundaries coincide with segments of Paraguay's international boundaries with Argentina and Brazil, forming a continuous international and regional border from the environs of Encarnación, on the Alto Paraná River in the south, to Bella Vista, in the north. From Encarnación to Guairá Falls (Salto del Guairá; 24°05'S-54°16'W) the Alto Paraná River forms the border. From Guairá Falls the border turns westward along the water divide between small streams to approximately 24°00'S-55°20'W and, finally, northwestward along the crest of the Amambay Hills to the vicinity of Bella Vista (22°08'S-56°31'W).

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\* The information in Part I of this report on Paraguay is based on the best sources available to this office as of 1 August 1960.

\*\* The departamento is the first-order civil administrative division of Paraguay.

\*\*\* The map annex is Part VI of this report.

## II. Physical Environment

### a. Terrain

The Eastern Upland is essentially a broad cuesta or gently tilted plateau that, as a result of considerable stream dissection, has an undulating to rolling surface. In general, the plateau slopes from west to east toward the Alto Paraná Valley. The dissected western margin constitutes the water divide between the Paraguay and Alto Paraná river systems and viewed from the west appears as an irregular north-south trending zone of hills. For the purposes of this study, the western hill zone is divided into three parts -- the Amambay Hills north of 24°30' south latitude; the San Joaquín Hills between 24°30'S and 25°00'S; and the Caaguazú Hills south of 25°00'S.

On many maps of Paraguay the western hills are somewhat exaggeratedly depicted as mountain ranges called the Cordillera de Amambay, the Sierra de San Joaquín, and the Cordillera de Caaguazú. The crestline of the hills generally is approximately 400 meters (1,300 feet) in elevation and has a maximum elevation of only 700 meters (2,297 feet). The Caaguazú Hills for the most part rise sharply above the campos of central Paraguay, and sections of the Amambay Hills, north of 24°00'S, form discontinuous bluffs. Elsewhere, the Amambay Hills and the San Joaquín Hills have elongated spurs and emerge gradually above the level of the adjacent lowlands.

The main plateau -- east of the water divide -- has a low surface gradient ranging from approximately 0.2 percent to 0.4 percent along east-west traverses. The north-south profile tends to be irregular,

however, because the numerous eastward-flowing tributaries of the Alto Paraná River have cut the plateau surface into a series of broad undulating to rolling interfluvies. The local relief seldom exceeds 150 meters (500 feet), however, and the gradient generally is about 1 percent. Slopes are commonly steep only along the valley margins. From north to south the hydrography of the plateau varies considerably.

The Acaray and Monday Rivers and their many tributaries spread out across the broad central part of the plateau forming a fan-shaped basin some 150 kilometers (100 miles) from east to west. These rivers have developed long, meandering courses across a generally level to undulating basin surface. The normal stream beds are relatively narrow, but the streams flow through broad floodplains that are entrenched below the general surface level of the basin. The sides of the floodplains are steep, and features such as river terraces and irregular depressions characteristically occur along the floors. During periods of high water the floodplains become the beds of greatly swollen streams. These entrenched floodplains are characteristic of even the small tributary streams; at the headwaters of such streams they appear as small amphitheaters. Floodplains are lacking only along the lower courses of the main streams -- approximately the 40-kilometer (25-mile) stretch upstream from the junction with the Alto Paraná River. In this downstream sector the valleys are narrow and deeply entrenched, and the rivers plunge over step-like falls, 25 to 35 meters (80 to 115 feet) high as they approach the side of the Alto Paraná Valley.



North of the Acaray-Monday Basin the plateau narrows somewhat in width and at one point the main water divide loops eastward to within 40 kilometers (approximately 50 miles) of the Alto Paraná Valley. Thus, the rivers flowing across the northern part of the plateau have relatively short courses, narrow valleys, and rocky river beds. The stream gradients are somewhat steeper, and the streams flow over vertical falls 25 to 50 meters (80 to 165 feet) high near their confluence with the Alto Paraná. In this sector the surface of the interfluvies is rolling to hilly.

The part of the plateau situated south of the Acaray-Monday Basin ranges from 50 to 80 kilometers (30 to 50 miles) in width. The streams flow in a generally southeasterly direction through winding, incised valleys. The over-all stream gradients are slightly steeper than those of the Acaray-Monday Basin, and, with the exception of the Macunday River, falls or rapids are not characteristic of the lower courses of the larger streams. The interfluvies are generally undulating to rolling with relatively steep slopes along their margins. Near the main water divide, where the plateau surface merges with the Caaguazú Hills, the interfluvies are more rugged, the local relief including both bluffs and sharp ridges.

Along the stretch of its course bordering the Eastern Upland Region the Alto Paraná River flows through a relatively narrow valley bordered by high bluffs. From Guaira Falls to Foz do Iguaçu (25°33'S-54°38'W) the river varies in width from approximately 90 to 200 meters (295 to 650 feet), and follows a rocky course between nearly vertical bluffs

70 to 90 meters (230 to 295 feet) high. Downstream from Foz do Iguaçu the river gradually widens and the vertical bluffs give way to bordering hills 30 to 70 meters (100 to 230 feet) high. Near Encarnación the Alto Paraná is approximately 1,300 meters (4,275 feet) wide.

b. Soils

The Eastern Upland bears a cover of generally deep soils ranging from lateritic loams to loamy sands. The soils of the western hill zone are derived principally from red sandstone and are red or reddish brown in color, ranging from loamy sands to sandy clay loams. The soils of the main Alto Paraná Plateau, east of the water divide, are derived primarily from basalt or volcanic ash. They are mostly deep red, lateritic loams or loamy clays. The upland soils are generally well drained, even excessively drained in areas of sandy texture. Along the floodplains of some of the larger streams such as the Acaray and Monday Rivers and their tributaries, however, the soils are poorly drained.

Scattered rock outcrops occur on the more rugged terrain, particularly in sections of the Caaguazú Hills, along the gorge-like valley of the Alto Paraná, and along the lower courses of many of its tributaries.

The upland soils are generally traversable with little difficulty except after heavy rains when exposed clays tend to be slippery. The poorly drained soils of the river floodplains, on the other hand, frequently are hard to traverse. For this reason, cross-country movement -- any movement off the established routes of travel -- in the Acaray-

Monday Basin would tend to be very difficult. Occasionally, wheeled motor vehicles may have trouble in negotiating steep slopes in the western hill zone where areas of sandy soil occur.

c. Flora and Fauna

Most of the Eastern Upland Region is heavily forested with hundreds of different species of tropical and subtropical trees. Although many of the trees are deciduous hardwoods, new leaf growth develops so quickly after the old leaves fall that stands of bare trees are rare at any season. The undergrowth of shrubs and vines is commonly thick and, in places, virtually impenetrable without the aid of a machete. The undergrowth is particularly dense along the margins of forest clearings. Dense growths of ferns and bamboo occur along the riverbanks.

Extensive tracts of virgin forest still exist even though the exportable timber has been removed from a wide band of forest along the periphery of the region, particularly in the zone adjacent to the Alto Paraná Valley; in the headwaters zone of the Acaray and Monday river systems; and in the Caaguazú Hills. As a rule, only scattered individual trees are removed in the logging process, and good stands of trees may remain in these partially exploited forests. This is particularly true of the forests adjacent to the Alto Paraná River. Extensive yerbales -- forests containing yerba trees in exploitable quantities -- are scattered throughout the Eastern Upland. The leaves of this evergreen shrub or small tree are picked periodically and dried to prepare yerba maté -- Paraguayan tea. Wild oranges are also scattered in widely separated patches throughout the forest area, and are exploited locally

to a limited extent for the extraction of petitgrain oil. In neither yerba nor wild orange exploitation are the forests completely cut over, but even cleared land quickly reverts to forest if not cultivated or utilized in some other way. The river floodplains of the Acaray-Monday Basin are generally devoid of forest vegetation, although low brush occurs in some sectors.

Sizeable tracts of land have been cleared in the southeastern part of the region in the vicinity of Hohenau (27°05'S-55°45'W), Hernandarias (25°22'S-54°45'W), and Itakyry (24°56'S-55°13'W); in the headwaters zone of the Acaray and Monday river systems; and in scattered areas of the western hills. Much of this land is used for pasture, although in all the cleared areas some land is cultivated and in the Hohenau area considerable land is under cultivation. Yerba is the principal crop, although cotton, tobacco, maize, mandioca, bananas, oranges, and other crops are also grown. Wild fruits and nuts are plentiful in the forest.

Edible wild game in the forest includes deer, wild pigs, paca (a rodent), armadillo and tapir. The latter is a large animal -- a distant relative of the rhinoceros -- and its meat is said to be good, but greasy. Other wild animals common to the forest include the jaguar, puma, ocelot, panther, and fox. Crocodiles (cayman) abound in the larger rivers; the tails of young crocodiles are considered a delicacy. Game birds are plentiful and include partridge, pheasant (martineta), wild turkeys, wild pigeons, and many varieties of duck. Finally, fishing is excellent on the many rivers. The dorado (South American golden salmon) is reputedly the best game fish, and the local surubi (a catfish),

pacu, and shad are also very good. Caution must be taken in swimming or crossing streams in order to avoid the vicious piranha, or cannibal fish.

Poisonous snakes are an ever-present danger. Varieties encountered include the rattlesnake, the yarará (a green snake about 5 feet long) and the kyryryó (a gray snake with white markings and a cross on its triangular-shaped head). The giant anacondas, or water boa constrictors, are common to the northern rivers of Paraguay but very rarely attack man.

Pests and vermin in the region include mbaragui (tiny black flying insects), mosquitoes, ants, termites, spiders, and ticks. Clouds of mbaragui are a constant nuisance. They bite all exposed parts of the body, and the bites frequently develop into running sores.

d. Climate

The Eastern Upland Region falls within the humid subtropical climatic zone having warm summers, mild winters, and no pronounced dry season. In many respects the climate resembles that of Florida. Variations that occur are due primarily to the location of Paraguay within the interior of the continent. (See Table, p. 10)

Average temperatures for this upland region are slightly lower than those for Paraguay as a whole. They range from approximately 22°C (71.6°F) in the Amambay Hills to 20.5°C (68.9°F) in the Caaguazú Hills as compared with an average temperature of 22.5°C (72.5°F) for the country as a whole. At Puerto Presidente Stroessner (25°33'S-54°37'W) the mean maximum temperature for January, the warmest month, is 31.9°C

(89.4°F), and the mean minimum temperature for July, the coolest month, is 10.9°C (51.6°F). Data are not available for other stations within the Eastern Upland Region, but variations probably would not exceed 3 degrees centigrade. The absolute maximum temperature recorded at Puerto Presidente Stroessner for the period 1943-1950 was 39.5°C (103.1°F) and the absolute minimum was -2.7°C (27.8°F). Although within the upland region the days are frequently hot during the summer, the forests provide shade; and the nights are regularly cool.

Average annual rainfall for the country as a whole increases from west to east, and the eastern uplands receive the greatest amount anywhere in Paraguay -- ranging from approximately 1,500 millimeters (59 inches) at the western border to about 1,800 millimeters (71 inches) along the Alto Paraná Valley. There are no distinct wet and dry seasons, but the least rainfall is received during the winter (June through August). At Puerto Presidente Stroessner the records for a 10-year period indicate autumn (March through May) as the season of maximum rainfall. Most of the rain falls in heavy showers of an inch or more, particularly during thunder storms in the hot months. Long cloudy periods are rare, although steady rains may last a week or more during the winter. Streams frequently flood after torrential rains. Flooding on the stretch of the Alto Paraná River that borders the Eastern Uplands, bears little relation to local rainfall because the greatest part of the river's volume comes from much farther upstream. The rise and fall of the river is considerable, however, and frequently has a tidal effect on its tributaries. Because of extremely complex physical factors,

including flash floods and tropical storms, a local rise of 3 to 6 meters (10 to 20 feet) and subsequent drop to the normal water level within a 24-hour period is not uncommon. The difference in level between the annual winter low-water mark and the summer high-water mark may be as great as 30 meters (100 feet) on this stretch of the Alto Paraná.

Relative humidity is fairly high in the Alto Paraná region. At Puerto Presidente Stroessner it ranges from 68.5 percent in December to 83.9 percent in June. During the winter months, fog frequently forms over the Alto Paraná River during the cool hours of the night and does not dissipate until 0800 or 0900 hours.

The atmosphere is reportedly extraordinarily calm in this forested region and winds or breezes are seldom felt beneath the tree canopy. Strong winds accompany some tropical storms, however, and tornadoes occasionally occur in the area.

Table  
Characteristics of Climate  
at Puerto Presidente Stroessner, Paraguay  
1940-50

Month	Temperature (Degrees Fahrenheit)			Rainfall (Inches)	Relative Humidity (Percent)
	Mean	Max	Min		
Jan	89.4	68.4	78.8	5.5	72.5
Feb	89.4	68.7	79.0	4.5	74.3
Mar	87.1	66.4	76.6	7.9	77.2
Apr	81.5	59.9	70.7	5.5	79.5
May	76.5	56.3	66.4	6.3	82.5
Jun	72.9	53.8	63.3	3.7	83.9
Jul	73.2	51.6	62.4	3.6	81.1
Aug	78.1	53.1	65.5	2.3	75.8
Sep	80.1	56.5	68.2	4.4	77.2
Oct	82.2	60.8	72.0	5.8	76.8
Nov	89.1	63.5	76.3	4.9	72.7
Dec	87.1	66.0	76.6	5.2	68.5

e. Water Supply

With the exception of very small arroyos, the streams of the Eastern Upland carry water throughout the year. The swift-flowing tributaries of the Alto Paraná in the northern and southern thirds of the plateau are particularly clear streams and would be good sources of drinking water. As an extra-precautionary measure, however, all water should be purified before being used.

III. Population

a. Distribution

The Eastern Upland Region is very sparsely populated. For more than two-thirds of the area the rural population density is less than 1 person per square kilometer (2.6 persons per square mile), and for most of the remaining third, the rural density is only 1 to 3 persons per square kilometer (2.6 to 7.8 persons per square mile). Exceptions occur along the southern and southwestern periphery of the region where relatively small pockets of dense population are encountered at Hohenau and Capitán Meza (27°01'S-55°34'W) and in the vicinities of Cecilio Báez (25°03'S-56°19'W), Villarrica (25°45'S-56°26'W), and San Juan Nepomuceno (26°06'S-55°58'W).

The urban population of the region, as enumerated in the 1950 census, is very small. Only 4 towns in the region had as many as 1,000 to 5,000 inhabitants; 3 towns had from 500 to 1,000 inhabitants; and the remaining 12 towns had less than 500 inhabitants each. With few exceptions the towns are located either along the periphery of the region -- in the western hills and along the Alto Paraná Valley -- or along the



periphery of the Acaray-Monday Basin. Most of the towns are little more than logging and yerba villages, although the four largest -- Hohenau, Buena Vista (25°55'S-55°34'W), Caaguazú (25°26'S-56°02'W), and Pedro Juan Caballero (22°34'S-55°37'W) -- are centers of diversified agriculture. Several tiny yerba villages, not classified as urban population centers in the 1950 census, are located at widely scattered points within the eastern half of the region.

b. Ethnic Groups

The principal racial element in the region is the native Paraguayan -- a Guaraní-Spanish mixture. Guayakie Indians still inhabit parts of northern Departamento de Alto Paraná and Departamento de Caaguazú. The Guayakie are a Guaraní tribe who have so far resisted any contact with civilization. Although not known as a savage tribe, these Indians have occasionally attacked people passing along the jungle trails.

About 7 percent of the total population of roughly 125,000 were classified as "foreigners" in the 1950 census enumeration. Of these, the European colonists (mostly Germans) have settled along the Alto Paraná Valley, particularly in the Hohenau area where they constitute approximately 6 percent of the local population. Other German settlements are encountered in the Caaguazú Hills east of Villarrica. Other "foreigners" include Argentinians and Brazilians. The former have settled mainly in the Departamento de Alto Paraná and the Departamento de Itapúa, where they constitute 3 to 4 percent of the departmental population; and the latter are located primarily in Departamento de Amambay, where they comprise 12 percent of the population.

In the region as a whole the language most commonly spoken is Guaraní. Roughly half the population speaks Guaraní only, and most of the remainder speak both Guaraní and Spanish. Departamento de Itapúa is an exception with 56 percent speaking both Guaraní and Spanish; 26 percent speaking Guaraní only; 14 percent speaking Spanish only; and the rest speaking other European languages, primarily German. Probably most of the persons speaking only Spanish live in those parts of Departamento de Itapúa that are situated outside the upland section. In general, the bilingual groups are found along the periphery of the upland region, whereas those speaking only Guaraní are encountered in the more remote sections of the interior.

c. Sanitation and Health

Only the most primitive sanitation practices are observed in the region, with the result that many diseases that could easily be eradicated under more sanitary conditions are prevalent. Ancylostomiasis (hookworm) is probably the most prevalent. Leishmaniasis, a parasitic infection of the body tissues, occurs sporadically within the region, particularly in areas of yerba forests. Malaria is endemic to the region, especially along the Alto Paraná littoral, and epidemics can be expected every 3 or 4 years. Various forms of dysentery and venereal diseases are common, and, finally, a prevalence of goiter has been observed in the more remote villages.

The region has few doctors or medical facilities. A small government hospital and a pharmacy are located at Itakyry, but as of late 1959 there was no qualified doctor in residence. A similar small

government hospital is located at Yhú (24°59'S-55°59'W). At Capitán Bado (23°16'S-55°32'W) an experienced physician-surgeon has set up an office and private hospital in his house. A regional hospital has been established at Pedro Juan Caballero, and regional hospitals are also located at Encarnación, Villarrica, Coronel Oviedo (25°25'S-56°27'W) and Caazapa (26°09'S-56°24'W) -- towns not very far from the periphery of the upland region.

#### IV. Civil Government and Military Centers

The Eastern Upland Region is very sparsely populated and has no large civil government centers for the administration of local affairs. Parts of 7 departamentos are included within the confines of the region, but the capitals of only 3 -- Alto Paraná, Amambay, and Caaguazú -- are located within the region, at Hernandarias, Pedro Juan Caballero, and Caaguazú, respectively. Nearly every permanent population center within the region, however, is the seat of government for a distrito -- the second-order civil administrative unit of Paraguay. Few distritos in the region have more than one town within their boundaries.

As of October 1959, Puerto Presidente Stroessner was the headquarters for the Fifth Military Region. The garrison consisted of an infantry detachment quartered at a former highway construction campsite located on the Brazil Road 2 kilometers west of town.

The Pedro Juan Caballero airfield is operated by the Paraguayan Army Air Force but at present has little military significance. Its operational capability is limited by a lack of hard-surface runways and poor servicing facilities.

V. Transportation

a. Roads

A road network as such is virtually nonexistent in the Eastern Upland Region. The recently opened "Brazil Road" -- extending from Asunción via Coronel Oviedo and Caaguazú to the Alto Paraná River at Puerto Presidente Stroessner, opposite Foz do Iguaçu, Brazil -- and a road from Encarnación to Hohenau are the only modern improved roads penetrating the region. A bridge over the Alto Paraná is currently under construction to connect the Brazil Road with a Brazilian highway extending from Foz do Iguaçu to Paranaguá, on the Atlantic Coast. The section of the Brazil Road crossing the Eastern Upland, east of Coronel Oviedo, is surfaced with red clay. Although adequate but dusty in dry weather, it becomes impassable during heavy rains and is officially closed to traffic. Work is underway to resurface this section of the road. The Encarnación-Hohenau road is constructed of gravel on a telford base and is passable in all weather. A comparable graveled road is to be constructed between Concepción and Pedro Juan Caballero. The short segment from Concepción to Horqueta (23°24'S-56°53'W) has been completed, but little progress has been made on the rest of the road, which is now only a poor, seasonal dirt road.

The few roads elsewhere within the upland region are little more than unimproved logging trails and usually are negotiable only by trucks or jeeps. Their motorability at any given time depends in large part upon the frequency of use. While logging operations are underway in a given area, the roads are generally kept in passable

condition, but as logging sites are shifted and individual roads are less frequently traveled, they quickly become overgrown with brush and trees. Logging operations have declined in the Alto Paraná region in recent years because of a drop in the lumber trade with Argentina, and therefore it is presumed that the frequent use of machete, shovel, and cable would be required to negotiate many of these roads. Itakyry is usually held to be the farthest point into the interior that automotive vehicles can regularly travel northward from Puerto Presidente Stroessner. An official Paraguayan motorized jungle expedition recently demonstrated that it is possible to travel by jeep from Puerto Presidente Stroessner to Pedro Juan Caballero, but not without considerable difficulty and a short detour through Brazilian territory between Capitán Bado and Pedro Juan Caballero. Specific logging roads that were reported as passable in the early 1950's and that may be regularly passable in dry weather are: (1) Villarrica-Caaguazú-Yhú-Itakyry-Hernandarias-Puerto Presidente Stroessner; (2) Caazapá-Buena Vista (25°55'S-55°34'W)-Nacunday (26°01'S-54°46'W); and, (3) Igatimí (24°05'S-55°30'W)-Capitán Bado.

Many local foot trails (picadas) are cut through the dense forest growth. Many merely lead from villages to nearby yerba forests or logging sites, and characteristically make unexpected turns and end abruptly in the forest.

b. Railroads

A branch of the Central Railway of Paraguay extends from Borja Station (25°55'S-56°28'W) eastward 65 kilometers (40 miles) to Abaí

(26°01'S-55°57'W). This branch line, constructed in 1914, constitutes the completed part of a now-abandoned project to extend the Central Railway to the Brazilian border at Foz do Iguaçu.

A short narrow-gauge industrial railway owned by Fassardi Limitada, S.A., connects with the Central Railway branch line at Tacuara Station (25°58'S-56°05'W) and extends eastward 36 kilometers (22.5 miles) to Villa Pastoreo (25°50'S-55°45'W). This short line hauls timber, plywood, paper, and other forest and agricultural products.

c. Waterways

Waterways constitute the principal transportation arteries of the region. The Alto Paraná River, the main waterway, is navigable upstream from Encarnación to Pôrto Mendes (24°32'S-54°21'W), situated approximately 50 kilometers (30 miles) below the Guaíra Falls. Vessels with drafts of 3 meters (10 feet) can navigate this part of the river. The speed of a vessel rather than its draft, however, is generally the limiting factor, particularly during high water in February and March when river currents run as high as 8 knots. The stretch from the mouth of the Iguaçu River north to Guaíra Falls is particularly treacherous for small boats not only because of the swift current but also a tremendous number of whirlpools.

Several tributaries of the Alto Paraná are also navigable, throughout or in part. The Acaray, Monday, and Macunday Rivers and their tributaries are navigable by small boats for most of their extent. Navigation is interrupted near the mouths of these rivers, however, where cascades 25 to 35 meters (82 to 115 feet) high mark the junctions with

the Alto Paraná. The Acaray river system is the most extensive, but because of its northeast-southwest orientation it is not used as extensively as the Monday system. The latter provides an easy east-west route from Caaguazú to the Alto Paraná littoral and is utilized during periods of high water to transport most of the yerba and timber production from the central plateau area. The Tembey River, located south of the Nacunday, is navigable in rainy periods for 40 kilometers (25 miles) upstream from its mouth. Navigation is not interrupted by rapids at its junction with the Alto Paraná as is the case with the tributaries located farther north.

The Jejui Guazú River, a tributary of the Paraguay River, extends for a short distance into the Amambay Hills in the northwestern part of the region. The Jejui Guazú and its tributaries can be negotiated by 30-ton to 40-ton boats as far as the hill zone, where the current becomes swifter as the gradient becomes more steep.

With the exception of the Jejui Guazú, the navigable streams of the Eastern Upland act as feeders for the Alto Paraná main artery. Dozens of landings or "ports" are located along both sides of the Alto Paraná Valley. Many of these "ports" consist merely of a wooden shack perched on the crest of the river bluff and bearing a crude sign indicating that this is "Puerto" something-or-other. Chutes or troughs constructed of bamboo extend from the shack down the bluff to a rough jetty. Yerba gatherers slide bags of dried yerba leaves down the chutes for loading on river steamers. The jetties may be only of sufficient size to dock small boats and therefore cargo or passengers must be carried by rowboat between the jetty and the steamer.

d. Air

The airfield at Pedro Juan Caballero is the only one in the Eastern Upland Region that has a runway more than 2,000 feet long. The 2 good sod runways at Pedro Juan Caballero are 3,600 feet and 3,000 feet in length. The airfield is operated by the Paraguayan Army Air Force, but is used jointly by Transportes Aeros Militares (T.A.M.), the military air transport line, and Linea Aerea de Transporte Nacional (L.A.T.N.), the government-owned civil airline. Small grass landing strips are located at Itakyry, Hernandarias, Caaguazú and Yhú.

L.A.T.N. operates 18 or more aircraft of four-passenger capacity; and apparently is permitted to use several DC-3 aircraft belonging to the Paraguayan Army Air Force. L.A.T.N. offers mainly charter or taxi service, but theoretically also offers scheduled flights to the principal cities of Paraguay.

VI. Telecommunications

Telecommunication facilities within the region are extremely limited. A telephone line extends from Encarnación 37 kilometers (22 miles) eastward to Hohenau, and a telegraph line follows the branch line of the Paraguayan Central Railway eastward to Abaí, a distance of 65 kilometers (40 miles). Radiotelegraph offices are located at Pedro Juan Caballero, Capitán Bado, and Puerto Presidente Stroessner.

VII. Economic Development

The principal natural resources of the Eastern Upland Region are its forests and agricultural land. No mining or manufacturing of any significance is carried on within the region. Most of the population is employed in the production of yerba mate and in logging.



Industrial Paraguaya is the largest single producer of yerba mate in the region. As of 1950, it processed and marketed 80 percent of the total Paraguayan production but actually produced only 25 percent of the national total. About 500 small growers who furnished less than 100 tons each produced about half of the total, and, presumably, the rest was produced by growers with larger holdings. Ninety-five percent of the yerbales are in wild trees, which can be harvested only once every third year. Therefore, harvesting crews generally relocate their camps after each harvest season. Cultivated yerba is managed as an agricultural crop and is harvested annually.

The most important timber stands of Paraguay are in the Eastern Upland Region. Logging operations, for the most part, are confined to localities where transportation is readily available -- either along the navigable streams or along the few good logging roads of the region. Individual logs are hauled from the logging site to the transportation head by means of high, two-wheeled oxcarts, and such movement of logs is not economically sound if the distance is more than 8 or 10 kilometers (5 or 6 miles). Logging operations have been curtailed somewhat in recent years because of a decline in the lumber trade with Argentina, the principal customer. Sawmills and other wood-processing enterprises are presumably in operation in the upland region, but data on their number and location are not available.

Diversified agriculture and cattle raising are gradually being developed in the region. Hohenau is the most flourishing agricultural center with its extensive yerba and orange groves, cotton and maize

fields, and livestock pastures. Cattle raising is important in the Buena Vista, Tavaí (26°07'S-55°32'W) and Caaguazú districts. A recent innovation has been the establishment of coffee plantations in the Pedro Juan Caballero area and at Cofisa, in the extreme northern part of Departamento de Alto Paraná.

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